PUBLIC SAFETY

PSWN PROGRAM

WIRELESS NETWORK

Saving Lives and Property Through Improved Interoperability

Post-Symposium Support Report— Los Angeles, California

FINAL

March 2003

Table of Contents

1.   INTRODUCTION

The Public Safety Wireless Network (PSWN) Program sponsored the Los Angeles Symposium January 28–30, 2003. The symposium was hosted by the Los Angeles County Fire Department (LACOFD) and the Los Angeles County Sheriff's Department (LASD). The three-day conference was composed of panels and group discussions addressing many of the financial, political, and technical issues challenging interoperability today.

The conference received much attention from several media groups, of which included the Antelope Valley Press (based in Palmdale, California), Chinese Daily News, KFWB-AM News radio 980 based in Los Angeles, KTNQ-Hispanic News radio 1020 based in Los Angeles, and KNX-News Radio 1070 based in Los Angeles.

This report provides a detailed summary of the events of the Los Angeles, California, PSWN Program Symposium. It is designed to be a historical resource for those who attended the symposium and to provide a broad overview for those who were unable to attend. In general, this symposium report highlights—

- Key presentations and panels discussed during the symposium

- Interoperability challenges and lessons learned that were discussed throughout the symposium

- Important facts and information that were provided to the audience.

The remainder of this report consists of 18 sections addressing the topics of each panel discussion and presentation at the symposium.

2. SYMPOSIUM TOPICS

The information on each topic area presented in this section was provided through presentations and panel discussions from members of the public safety community and the PSWN Program representatives. The topics were selected to give the symposium attendees a perspective on the PSWN Program and efforts to improve communications interoperability. The topics covered are listed below:

- Welcome and Keynote Addresses

- Public Safety Wireless Interoperability National Strategy (Public Safety WINS) Web site Presentation

- PSWN Program Update

- SAFECOM Update

- AMBER Alert: Interoperability in Action

- Southern California Interoperability Project

- Interoperability—Hard Lessons and Challenges

- Trials and Tribulations of Interoperability in Orange County, California—Pitfalls to Avoid

- Grants and Funding: Where to Apply for Assistance and Who Has the Money

- Video Downstream: How Technology Is Helping to Improve Interoperability for Public Safety

- Personal Digital Assistants (PDA) and Public Safety Communications

- Protecting Wireless Communications Infrastructure From Vulnerability

- Capital Wireless Integrated Networks (CapWIN)—Connecting the Washington, DC, Metropolitan Area

- Vendor Panel: Interim Solutions to Interoperability

- Communications During the Sniper Incident in the Washington, DC, Metropolitan Area

- Interoperability Success in San Diego County—the Regional Communications System (RCS)

- Spectrum Issues

- Next Symposium State Presentation and Invitation.

The following sections present each topic, supported by the remarks of the presenters.

2.1   Welcome and Keynote Addresses

At the Los Angeles Symposium, 244 public safety officials from around the country assembled to discuss various topics relating to public safety wireless communications interoperability. Sheriff Leroy Baca of the LASD and Fire Chief P. Michael Freeman, LACOFD, provided welcoming remarks. The scheduled keynote speaker, the Honorable Jane Harman, U.S. House of Representatives, 36th Congressional District of California, was unable to attend the symposium, but she sent a letter that was read on her behalf.

Sheriff Baca welcomed the PSWN Program and the symposium attendees to Los Angeles. He highlighted the criticality of interoperable communications in the wake of the September 11 terrorist attacks. He challenged the audience to use this symposium as an opportunity to forge new relationships with other nearby jurisdictions and regions and to cross the relationship boundaries that so frequently impede interoperability.

> *"We are here today to solve one of the country's more vexing problems—interoperability and information sharing."*
> **Sheriff Leroy Baca, LASD**

Fire Chief Freeman also extended a warm welcome to attendees on behalf of the Los Angeles County Fire Department. He described how everyday interactions and communications were commonly misinterpreted. He said that effective communications were imperative to ensuring efficient emergency response efforts. In conclusion, he described some of the challenges hindering interoperable communications within the Los Angeles region, including a lack of coordination, a high number of municipalities operating unique systems, and demanding coverage requirements.

In her letter, Congresswoman Harman commended the audience for advancing the state and usage of wireless technology for public safety. She described plans to reintroduce the Homeland Emergency Response Operations, or HERO Act, which would fulfill Congress' 1997 promise to provide spectrum for public safety communications. She also explained that acquiring necessary funding to develop and upgrade communications systems was a high priority. She concluded by thanking the audience for its leadership in the public safety arena.

2.2   Public Safety Wireless Interoperability National Strategy (Public Safety WINS) Web Site Presentation

Mr. Rick Murphy, PSWN Program Manager for the Department of the Treasury (Treasury), presented the Public Safety WINS Web site. He described Public Safety WINS as a national roadmap for improving interoperability among public safety wireless networks, containing an expanding collection of interoperability solutions that, if implemented over time,

will significantly impact interoperability nationally. Mr. Murphy said the program envisioned that information contained in Public Safety WINS would be used by the entire public safety community, as well as senior leaders at all levels of government, to improve and implement interoperable wireless communications networks.

Mr. Murphy explained that Public Safety WINS had two primary components. The first was a continually growing catalog of technical and policy interoperability solutions. He said that as a result of performing interoperability case studies and pilot projects across the Nation, the program continued to gather and add to its suite of sound, transferable technical solutions. He said that the program had also identified and created policy solutions to help coordinate shared systems development.

Mr. Murphy said that the second component of Public Safety WINS was an ongoing effort to research the status of interoperability nationwide. He said that the program had highlighted shared statewide systems development successes as well as local and regional development activities. He concluded by saying that the culmination of the program's research efforts had led to the development of an interoperability index that quantitatively measured interoperability within each state. For further information on Public Safety WINS, visit the Public Safety WINS Web site at www.publicsafetywins.gov.

2.3   PSWN Program Update

Mr. Bob Lee, PSWN Program Manager for the Department of Justice (DOJ), provided an overview of the critical challenges to improving interoperability. He began by stating that wireless communications interoperability was necessary to improve the ability of the public safety officers to save lives and property, facilitate rapid and efficient interaction among all public safety organizations, and provide immediate and coordinated assistance in day-to-day missions, task force operations, and mass casualty incidents. He added that the events of September 11 had highlighted the necessity for effective public safety operations and that the ability to communicate heavily impacted the effectiveness of public safety first responders.

Ultimately, Mr. Lee said, effective communications was a key component of homeland security. The ability to communicate was important in saving lives and protecting property because it made possible incident command and control, dissemination of information in real time to areas in need, improvement in evacuation coordination, and reduction in causalities.

Mr. Lee then described the PSWN Program and what it was doing to improve public safety wireless communications interoperability. For further information on the program, visit the program's Web site at www.pswn.gov.

2.4   SAFECOM Update

Ms. Susan A. Moore, Project Manager, SAFECOM, was unable to attend the symposium but, in her absence, wrote a letter that described SAFECOM's recent progress. This progress included—

- Launching a short-term task to identify successfully fielded interoperability solutions. The objective is to model successful technologies and processes that SAFECOM can

share with the public safety community through Public Safety WINS tools, and, ultimately, fund through federal grants, and other assistance programs.

- Working with the PSWN Program to tailor the Public Safety WINS tools to support a slightly different format for those solutions likely to be funded through the grants processes. The tailored format will include some additional information beyond that currently provided by the Public Safety WINS Web site.

- Actively meeting with grant-making organizations to develop mechanisms for streamlining grant application processes leading to total solutions (i.e., the preparation, configuration, implementation, training, and maintenance of SAFECOM solution set models). E-Grants, another Federal Presidential Electronic Government initiative, will work with SAFECOM to assist participants with online processes as requirements for new processes are identified.

- Extending an invitation to the public safety practitioner community in the near term. The invitation will be to participate in a requirements definition and analysis project. The goal of the project is to identify cross-disciplinary and cross-jurisdictional requirements for interoperable communications based on use case scenarios, with the end result supporting the development of a gap analysis, concept of operations, and an architectural framework design effort.

- Working closely with the Office of Homeland Security Transition Office over the course of the past 60 days to ensure that the direction of the program is aligned with Homeland Security objectives. SAFECOM anticipates a move into the new department within the next 60 days.

2.5   AMBER Alert: Interoperability in Action

Sergeant Alfred Ortega LASD, explained that the AMBER Alert System was California's active, high-priority communications message that was distributed via multiple media with the intent to raise awareness of a recent abduction of a minor. This system was created to better provide for adolescents' safety. According to Sergeant Ortega, four criteria must be met before an AMBER Alert could be signaled—

- A confirmed abduction has occurred.

- The victim is 17 years of age or younger, or of proven mental or physical disability.

- The victim is reasonably believed by local law enforcement to be in imminent danger of serious bodily injury or death.

- There is information available that, if disseminated to the general public, could assist in the safe recovery of the victim.

Sergeant Ortega indicated that once an amber alert had been qualified, it was "pushed out" to media, fax machines, radio, the police, and State of California Web sites, computer

terminals, freeway signs, and e-mail in an attempt to "get the word out" regarding the abduction. Sergeant Ortega said that the AMBER Alert System had proved valuable in saving lives on several occasions.

Ms. SunDance Gima, Fire Command and Control Training Coordinator, LACOFD, explained that the success of the AMBER Alert System depended on the swiftness and timeliness with which the alert was delivered. She explained that 74 percent of children were murdered within the first three hours of the abduction. The advantage of the system, as she described, was that from the moment the abduction was deemed an AMBER Alert situation to the moment the message was actually distributed was usually 35 minutes or less.

Former Assemblyman George Runner, District 36, California State Assembly, touted the influence that the system had had in the prevention of abductions. He was the author of the AMBER Alert System and said he believed that, "Future children will not be abducted because perpetrators will realize that they will be caught by the alert's massive bombardment of information." According to Mr. Runner, the result of the alert was that lives were saved.

> *"Public safety officials should be persistent in petitioning for the development of communications systems."*
> **George Runner, Former Assemblyman, California State Assembly**

2.6   Southern California Interoperability Project

This panel discussed the interim and long-term solutions for public safety communications interoperability in the six-county region surrounding Los Angeles, including Kern, Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties. They discussed the area's pursuit of the development of a large-scale regional communications system, the Southern California Regional Tactical Communications System (SCRTCS).

Panelists pointed out that the area frequently suffered from large-scale natural disasters (e.g., earthquakes) and public unrest and, accordingly, interoperability was especially critical in the Southern California region. They added that Los Angeles County was a communications and interoperability challenge because of its vast mountainous regions, high population density, and large number of autonomous jurisdictions.

Captain Robert Sedita, LASD, moderated the panel. The following are highlights of the panel discussion.

- Mr. Jamie Urrutia, Telecommunications Systems Engineer, LACOFD, said that approximately one year ago, Los Angeles County hired an independent consultant to develop a conceptual design and recommendations for the development of a shared system that would include the six-county surrounding area. The design of the system will account for the Federal Communications Commission's (FCC) re-farming of spectrum resources. Mr. Urrutia anticipated that Los Angeles County would begin development of a request for proposals in the near term.

- Mr. Ron Wong, Los Angeles County Internal Services Department, described the radio systems used by public safety agencies within the Los Angeles area as mostly disparate and operating across all four frequency bands. Because interoperability was such a challenge in the area and collaboration would be needed to successfully develop a large-scale system such as the SCRTCS, Mr. Wong said that the region recently formed an Executive Committee to oversee the system. He also indicated that the system would be intended for use at the command level as opposed to the tactical level.

  Mr. Wong said that Los Angeles County contained 88 cities and, as such, suffered coordination problems between the various cities' public safety responders at the scene of a major emergency. To address the county's interoperability needs, Mr. Wong said that they had hired an independent consultant to further research the issue.

- Assistant Fire Chief Mike Morgan, LACOFD, said he was "confident county agencies will talk together in time in a seamless and integrated fashion." Chief Morgan also stated that, "what is important is the result to the citizen and the care we can provide to them." He was impressed with the coordination and partnerships exhibited thus far by each of the six counties involved in the SCRTCS effort. He remembered a time when coordination between these counties was non-existent. In closing, Mr. Morgan charged the audience to continue making partnerships to continue upon the success thus far.

- Captain Sedita stated that proper training was imperative in ensuring a successful system. He explained that jurisdictions within the Los Angeles regions used different operational codes when responding to incidents. Once the SCRTCS was implemented, he said that the creation of a common set of operations would be necessary to ensure communications were understood correctly as intended.

- Captain Sedita informed the audience that Los Angeles County had recently purchased several interoperability solutions. These included two JPS ACU-1000 switches, as well as a deployable communications van with a JPS ACU-1000 switch on board. Raytheon developed this van for emergency response situations. Altogether, he explained, these switches were intended for connecting systems using disparate frequency bands across the Los Angeles County area during emergency response scenarios.

2.7   Interoperability—Hard Lessons and Challenges

Deputy Chief Keith Bushey, San Bernardino County Sheriff's Department, formerly worked for the LASD. At the LASD, he focused on communications issues for the County of Los Angeles. He explained that the LASD was the major contributor to the attainment of additional frequencies to be used for interoperability within Los Angeles County. To acquire these frequencies, the county hired a lawyer to lobby on its behalf, made countless presentations to elected and appointed officials on Capitol Hill, and petitioned the FCC. He stated that persistence was the key element for the interoperability success achieved thus far in the Los Angeles area.

Deputy Chief Bushey presented a number of flawed assumptions he observed during his experiences with systems development and interoperability issues in the Southern California region. The table below presents those assumptions.

Flawed Assumptions
• Robust interoperability would logically occur when adjacent agencies developed the capability
• Inappropriate use (i.e., for personal reasons) would occur on wide-area tactical channels, and supervision of activities would become a problem
• Access channels used to coordinate field activities could be made adequate and efficient instead of immediate use of each other's dispatch channels
• Getting police officers to talk on dispatch channels would not be difficult
• Agencies would be willing to give up old channels for re-farming

The table below presents Deputy Chief Bushey's lessons learned.

Lessons Learned
• Insist on operational personnel as part of all systems development efforts. Possibly partner operational personnel with technical personnel to ensure the system performs correctly
• Operational personnel, not technical personnel, should develop the procedures for interoperability use. Operational personnel are more in tune with developing protocol for these procedures
• Mandate immediate tactical interoperability along with channel loading using criteria developed and evaluated by operational personnel
• Restrict data channel allocation to either large agencies or a consortium of smaller agencies
• Resist foolish studies on interoperability and create interoperability by using either direct channels or a cross-band process
• Provide for regional operational input in the frequency coordination process and try to keep agencies from developing systems that detract from interoperability
• Lean a bit harder on commercial vendors to tailor solutions to specific needs (e.g., dual band radios, 800/480 megahertz [MHz] extender)
• Maintain any coordination committees used to develop systems

Deputy Chief Bushey then described the communications and interoperability capabilities of the law enforcement entities within San Bernardino County. He said that the county's police and sheriff's departments used 800 MHz land mobile radio (LMR) systems while the California Highway Patrol uses the low-band very high frequency (VHF) band. To address interoperability, he explained that the county is in the process of developing mandatory regulations for county police to use mutual aid channels if there is a possibility of crossing over the county boundary. These mutual-aid channels, explained Deputy Chief Bushey, have been created beforehand in partnership with all counties adjacent to San Bernardino and require a supervisor to oversee the channel switching process (e.g., ensure channels are used correctly, overseeing the connection of both parties).

2.8   Trials and Tribulations of Interoperability in Orange County, California—Pitfalls to Avoid

This panel discussed the panelists' experiences during the development of Orange County's LMR system. Orange County recently implemented an 800 MHz, digital, trunked communications system using simulcast technology and serving more than 100 public safety agencies and more than 15,000 total portable and mobile subscribers. Mr. Gary Gray, Communications Engineer, Orange County Sheriff's Department, moderated the panel.

Before Orange County implemented its 800 MHz system, Chief Steven Staveley, Buena Park Police Department, said that the county operated an ultra high frequency (UHF) system. He said that the system was replaced because the department could not acquire the necessary frequencies to expand and accommodate additional users. As a result, he said, the county decided to implement within the 800 MHz frequency band because the spectrum was available. During his participation in the systems development, Chief Stavel identified five transferable best practices. These best practices are presented in the table below.

Best Practices
• Ensure that both lateral and vertical relationships are in place before embarking on the development of a system
• Get the "big kahunas" on board and excited about the project
• Expect anything that could go wrong will go wrong
• Know that the vendors responsibility is to their shareholders, not your county's stakeholders
• Start a stakeholder committee to oversee the system and keep it running

Mr. Joseph Robben, Communications Division Manager, Orange County Sheriff-Coroner Department, said that there were five obstacles impeding the progress of the system's development—unforeseen litigation, technology problems, zoning, county bankruptcy, and system acceptance.

First, Mr. Robben said, was the unforeseen litigation that cropped up in April 1995 when the equipment vendor sued the county. This lawsuit was time consuming and stressful for the county. Second, he said that technology problems surfaced throughout the development of the system. These problems included holes in coverage, insufficient power, cellular interference, and faulty radios that were inoperable. He said that these problems significantly lengthened the time to completion. Third, he added, there were obstacles to the acceptance of zoning sites to accommodate the communications towers. The county had a difficult time acquiring permits as well as traversing the lengthy permit application process. Fourth, the county suffered bankruptcy in 1994. The bankruptcy strained the relationships of the systems stakeholders and supporters. Lastly, he said that problems occurred with the system's final acceptance. Mr. Robben said that it was a huge task to ensure the system fully met the county's specifications and all coverage issues were resolved.

Mr. Robert Stoffel, Emergency Communications Coordinator, Communications, Orange County Sheriff-Coroner Department, stressed the importance of planning at the operational level. Because a large number of jurisdictions were joining a single system, operational protocols and procedures needed to be uniform for communications to be understood correctly and as intended.

He said that this uniformity needed to be applied to operational issues such as programming mobile radios, dispatching, channel conventions, and training.

Mr. Richard Toro, Senior Fire Communications Supervisor, Orange County Fire Authority, described some considerations when transitioning from old to new systems. He said that detailed planning was necessary for a smooth transition. He advocated that internal personnel knowledgeable about the system oversee the transition—not the system's vendor. To counter the limited resources that were usually available during the transition cycle, he recommended that mutual-aid channels be set up during the transition period for interoperability purposes. "Interoperability needs to be used as much as possible, and it should be second nature, especially as we transition into new systems," said Mr. Toro.

2.9 Grants and Funding: Where to Apply for Assistance and Who Has the Money

Corporal Bruce Clemonds, Grants Projects Special, Missouri State Police, encouraged symposium attendees to look beyond traditional sources of public safety funding (e.g., DOJ) to others such as the Department of Education, Department of Health, and the Department of Transportation, for grants to assist with public safety communications as a component of supporting these agencies' missions. He added that state and local applicants could pool grants from multiple sources to address joint communications needs.

Corporal Clemonds pointed out that online resources were valuable research and application tools as the grant process moved away from traditional paper-based activity. He added that *several grants could only be applied for online.* Corporal Clemonds provided the following list of these online resources:

Funding Resources
http://www.fedbizops.gov (Federal Business Opportunities)
http://www.firstgov.gov (Federal Government Grants)
http://www.ojp.usdoj.gov/BJA/ (Bureau of Justice Assistance)
http://www.ojp.usdoj.gov/nij/funding.html (National Institute of Justice)
http://ojjdp.ncjrs.org/grants/grants.html (Office of Juvenile Justice and Delinquency Prevention)
http://www.ojp.usdoj.gov/ovc/fund/welcome.html (Office for Victims of Crime)
http://www.ojp.usdoj.gov/bjs/funding.htm (Bureau of Justice Statistics)
http://www.ncjrs.org/fedgrant.html (National Criminal Justice Reference Service)
http://www.usdoj.gov/cops/gpa/default.htm (U.S. DOJ Response Center)
http://www.opm.state.ct.us/pdpd1/grants/llebg.htm (Local Law Enforcement Block Grants)
http://fr.cos.com/Docs/aboutfr.shtml (Federal Register)
http://www.cfda.gov/ (Federal Domestic Assistance Catalog)
http://fdncenter.org/funders/ (Foundation Center)
http://www.cof.org/resources/grantresources/index.htm (Council on Foundation Center)
http://www.hud.gov/grants/index.cfm (Housing and Urban Development [HUD] Clearinghouse)
http://www.acf.dhhs.gov/grants.html (National Clearinghouse on Child Abuse and Neglect Information
http://www.pswn.gov/library/lib_funding.htm (PSWN Program)
http://www.access.gpo.gov (U.S. Government Printing Office)
http://www.whitehouse.gov/omb/grants (Office of Management and Budget-Grants Management)
http://www.ntia.doc.gov (National Telecommunications and Information Administration
http://www.nlectc.org/agile (Agile—Interoperability Strategies for Public Safety)
http://www.epgctac.com (Electronic Proving Ground—Technology Transfer Program)
http://it.ojp.gov (Office of Justice Programs—Information Technology Initiatives)

Corporal Clemonds reported that DOJ's Community Oriented Policing Services program was anticipated to expand significantly and that current legislation in the Senate (Bill S. 924) had the potential to address interoperability in communications. He also suggested that the Technology Transfer Program was, and might increasingly be, a good, fast-turnaround source of current generation equipment.

Corporal Clemonds closed by saying that it was important to note the distinction between "hard" funds matching (e.g., for Local Law Enforcement Block Grants), which required 10 percent cash, as opposed to "soft" matching, in which in-kind service and/or resources could be matched based on value.

2.10 Video Downstream: How Technology Is Helping to Improve Interoperability for Public Safety

This discussion focused on the accomplishments of the U.S. Park Police and the LASD regarding their usage of down-link video technology. The use of down-link video technology has enabled both of these organizations to transfer real-time images via helicopter to stationary ground sites. Both of these organizations recommended down-link capabilities for enhancing communications at the scene of an emergency incident.

Lieutenant James Thornton, LASD, described LASD's continuing development and enhancement of its down-link video system. He said that the system was being implemented in a phased approach. The first phase, which consisted of implementing the basic system features, such as mounting the camera to the helicopter, constructing a tower site, and constructing a receiving station, was completed in 2000. He said that currently, the department was exploring the use of satellites to distribute images across their wide-area network and the Internet as a possible conduit for transferring images. As the department continued to enhance its system, he said that many challenges would need to be overcome, such as obtaining necessary financial support. The department would also like to expand the footprint of this system to include the five nearby counties of Kern, Orange, Riverside, San Bernardino, and Ventura.

Sergeant Kathleen Harasek, U.S. Park Police, stated that her agency provided a wide range of airborne law enforcement services to local, state, and federal law enforcement agencies. These services included search and rescue, Medivac, and dignitary protection. She said the U.S. Park Police was unique because it had the ability to pursue across state boundary lines. Sergeant Harasek indicated that this ability had made the use of Park Police's helicopter and, more specifically, its down-link video capabilities highly desirable to state entities pursuing offenders. She explained that the Park Police's current down-link capabilities were primarily used for relay of information at large demonstrations and insurrections, fire mapping, traffic assessments, U. S. Secret Service missions, and surveillance.

2.11 Personal Digital Assistants (PDA) and Public Safety Communications

Sergeant Larry Bryant, LASD, described the future use of mobile data technology— PDAs—for public safety communications. He said he had recently developed a PDA solution for the LASD that could access booking photographs from a wide-area network of law enforcement agencies in Los Angeles County. In the future, Sergeant Bryant envisioned using PDAs to share data with multiple agencies located within multiple jurisdictions. Data sharing

might include accessing fingerprints and other biometric information, mugshots, police files such as warrants, and video. In addition, he thought that PDAs should replace the manuals and checklists that were cumbersome and bulky for officers. By distributing PDAs among officers and thereby, centralizing access to frequently used resources, he contended that officers would increase their time to perform "old-time" police work such as foot and bicycle patrol, and surveillance.

Sergeant Bryant said that implementation of PDAs for officers presented a few challenges. Some of these challenges included the limit to available bandwidth, limited funding for development and implementation, protecting the actual PDA from damage (e.g., dropping it), and decreasing the physical size and weight of the unit.

Sergeant Bryant reported success using a PDA to access California Department of Motor Vehicles drivers license photographs over the Internet. Using the Cisco Content Transformer Engine Model 1400, he was able to access images in the field at 19.2 kilobits per second (Kbps). He said that he used a Compaq Pocket PC as his preferred PDA type because it could support 128-bit encryption.

The following question and answer were presented:

1.   Has the Los Angeles County Sheriff's Department performed testing using General Packet Radio Service (GPRS) and Cellular Digital Packet Data (CDPD) service?

Mr. Bryant said that testing was conducted with GPRS recently, which resulted in a 40 Kbps throughput throughout all of Los Angeles County. He said that CDPD service had not yet been tested.

2.12   Protecting Wireless Communications Infrastructure From Vulnerability

Mr. David Perry, Global Director of Education, TrendMicro, explained the vulnerabilities facing public safety communication networks and what attendees could do to protect their systems. He began by defining three forms of computer viruses that could cause a computer system to fail. He defined a virus as anything that replicated itself without authority, a worm as a virus that moved itself from computer to computer, and a Trojan horse as a virus that typically came in through e-mails and was an executable. He predicted that wireless viruses would take over the virus battleground in the future.

Mr. Perry closed by advising attendees to access only trusted virus Web sites (i.e., Symantec and McAfee) and avoid Web pages claiming to provide the latest on viruses, indicating that these sites frequently contributed to spreading viruses rather than stopping them. In addition, he offered the following Web site as another good source of information on viruses: www.wildlist.org.

2.13   Capital Wireless Integrated Networks (CapWIN)—Connecting the Washington, DC, Metropolitan Area

Mr. Michael Hill, University of Maryland College Park, Center for Transportation Technology, presented details on the CapWIN project—a partnership among Maryland, Virginia, and the District of Columbia focused on developing an integrated transportation and criminal justice information wireless network. He said the project would integrate the area's transportation and public safety data and voice communications systems. "The project will be completed in multiple phases including an initial strategic planning phase (completed), the implementation phase (currently underway) and a continuous development and expansion phase"[1]. Upon the project's completion in 2004, he said that CapWIN would enable more than 40 agencies throughout the Washington, DC, metropolitan area to communicate seamlessly and in real time. Mr. Hill listed the project's sponsors as—

- U.S. Department of Justice
- Maryland State Highway Administration
- Virginia Department of Transportation
- U.S. Department of Transportation
- National Institute of Justice
- PSWN Program.

Mr. Hill explained that the CapWIN solution was a wise choice for the Washington, DC, metropolitan region. He said that the solution would have minimal impact on existing legacy systems in the area and offer a Web-based architecture that would be scalable to accommodate future demands. To meet the needs of those law enforcement agencies needing transmission security, he explained that CapWIN would use 128-bit encryption and meet law enforcement standards for the transmission of sensitive information. The solution would offer cost savings to each user agency by taking advantage of commercial off-the-shelf (COTS) software where applicable and offering capabilities across a wide range of agencies, thereby reducing overall system costs.

Mr. Hill reported that the CapWIN project had been successful in two areas thus far. These successes were planning and partnerships. Before implementation of the system began, a pilot project was conducted to determine the difficulty and challenges that might lie ahead. The pilot tested access to the Virginia criminal database from District of Columbia and Maryland Police cruisers. The pilot proved successful because of, "the diligence, foresight, and fortitude with which the pilot was undertaken." Before technology was implemented, Mr. Hill stated, the agencies needed to "buy-in" to systems development. He said that achieving user buy-in made the transition, implementation, and future use of the system much smoother. The more agencies that bought-in, he said, the more efficiently limited resources could be allocated, the less duplicative efforts became, and the easier information could be shared among users.

2.14   Vendor Panel: Interim Solutions to Interoperability

This panel discussed the equipment currently available to public safety agencies that would allow them to enhance their level of communications interoperability. Mr. Jeffrey

---

[1] *http://www.capwinproject.com/defined.html*

Puckett, Integrated Wireless Network Joint Program Office, Department of the Treasury, moderated the discussion. He began by asking each vendor to provide a description of the product line for the public safety community.

The following questions were asked:

1.   Why are vendors not developing a dual-band, handheld radio?

Mr. Bill Fivek stated that Motorola has begun development of a dual-band radio. Two types of dual-band radios will be offered—a UHF and VHF compatible radio, and a UHF and 800 MHz compatible radio. Both of these types will be ruggedized and Project 25 compliant. He anticipates a release date in the near future. He also commented that the demand of the marketplace drives Motorola's product offerings.

2.   For the Motorola representative: When will you release a handheld radio that operates in the 450 to 512 MHz frequency range?

Mr. Bill Fivek, Motorola, anticipated a release date of one year. Mr. Bob DiDonato commented that Thales Communications currently offers a radio that operates within the 300 to 512 MHz frequency band. Mr. DiDonato described that this radio is currently used by the Department of Defense in Afghanistan.

3.   Is satellite technology able to overcome communications barriers such as weather?

Mr. Austin Comerton, Mobile Satellite Ventures, commented that he has not witnessed a degradation of transmission quality during conditions of extreme smokiness such as forest fires.

4.   There seems to be a trend toward shared systems development and consolidation. Is the JPS ACU-1000 the only technology available to interconnect systems?

Mr. Jeffrey Logan, M/A-COM, described the NetworkFirst product, which provides a scalable interoperability solution for emergency response efforts.

Communications-Applied Technology		Gary Stanfill
Product(s)	•	Incident Commanders' Radio Interface (ICRI)
Description	•	Specialize in the manufacturing of wireless voice communications systems
Benefits and Drawbacks for Public Safety and Interoperability	•	Produces a portable switch that connects disparate systems, radios, and telephones across bands and operational platforms for mutual aid operations
	•	Products provide radio interoperability for first responders and their commanders

EF Johnson		Jim Holthaus
Product(s)	•	100 percent compatibility with Motorola's SMARTNET/SmartZone trunked radio systems
	•	Netelligent voice over Internet Protocol (IP) solution integrates Association of Public-Safety Communications Officials (APCO) Project 25 and Internet-based technological standards
	•	Multi-Net II System
Description	•	Produce conventional and trunked radio systems
Benefits and Drawbacks for Public Safety and Interoperability	•	Multi-Net II system offers a full set of features for the public safety market. These features include an emergency system access switch, the ability to set priority levels, priority queuing, and the ability to operate in the conventional mode if the need arises. All EF Johnson Multi-Net II systems follow the technical guidelines documented in the APCO 16 standard

Mobile Satellite Ventures		Austin Comerton
Description	•	Satellite Communications Provider
Benefits and Drawbacks for Public Safety and Interoperability	•	Offer reliable mobile data capabilities for first responders

M/A-COM		Jeffrey Logan
Product(s)	•	NetworkFirst
Description	•	Produce conventional and trunked radio systems
	•	NetworkFirst components: SkyGate and SkyCenter
	•	SkyGate converts audio from interconnected radio systems to IP packets and sends to central SkyCenter hub
	•	SkyCenter hub serves as an IP voice switch and switches calls among SkyGates
Benefits and Drawbacks for Public Safety and Interoperability	•	Provides a wide area interoperability solution linking existing disparate public safety LMR networks and connecting users operating within their home network coverage areas
	•	Offers universal connectivity through a public switched telephone network connection
	•	As IP-based system, allows substantial scalability capable of incorporating continuing advancements in IP and COTS products
	•	Enhanced Digital Access Communications System, which allows the user to interact with one or more public safety communications systems for the exchange of voice information according to a prescribed manner and procedure

Motorola, Inc.		Bill Fivek
Product(s)	•	Radio system lifecycle management services
Description	•	Produce conventional and trunked radio systems
	•	Provide implementation, technical, and management consulting services
Benefits and Drawbacks for Public Safety and Interoperability	•	Manages risks of increasing costs of ownership through effective lifecycle planning for systems development
	•	Integrates interoperability needs, appropriate financial models, replacement costs, and other key management needs into system life-cycle plans
	•	Motorola's equipment is proprietary

Raytheon	
Product(s)	• First Responder vehicle
Description	• Produce technology focused on improving homeland security
Benefits and Drawbacks for Public Safety and Interoperability	• First Responder vehicle supports satellite, radio, cellular telephone, and wireless local area network at the scene of an emergency incident. A computer controls the network and the entire communications system, including a radio link gateway allowing interoperability.

Thales Communications, Inc.	*Bob DiDonato*
Product(s)	• Portable handheld Project 25 digital compatible with wideband and narrowband analog systems
Description	• Produce secure, tactical, handheld and miniature radio equipment • Specialize in the production of small, lightweight, secure, tactical radio systems
Benefits and Drawbacks for Public Safety and Interoperability	• Radio technology supports interoperability at the scene of an emergency incident

2.15   Communications During the Sniper Incident in the Washington, DC, Metropolitan Area

Mr. Michael Bennett, Director, Electronic Services Section, Maryland State Police, began by providing an overview of the recent sniper attacks that occurred in the Washington, DC, metropolitan area. In total, two sniper suspects were captured after their alleged month long shooting spree, which consisted of 15 separate shootings that left 10 people dead. Although the majority of the shootings were in the State of Maryland, tracking the suspects required coordination from numerous local, state, and federal agencies from Maryland, Virginia, and the District of Columbia.

Mr. Bennett explained that communications among the entities involved in the investigation posed a significant challenge. He said that the State of Maryland primarily relied on one communications system throughout the ordeal—Montgomery County's new digital, trunked, 800 MHz system—although, the State Police's statewide, analog low-band VHF voice radio system was also used in a less significant role. Mr. Bennett said, "As the magnitude of the sniper investigation unfolded, it became very clear that a well designed voice radio system was needed to support the regional nature of the tactical response and investigation."

Mr. Bennett explained that communications preparation was critical to ensuring an effective response for those entities involved in the investigation. Specifically, there was a need to standardize codes and operational policies used among the jurisdictions involved. For example, he said that when an officer used a "10-13" code in Montgomery County, it meant a tow truck request, while to a state trooper, a "10-13" meant an officer in trouble. To remedy these issues, a Joint Task Force was created among all of the local, state, and federal entities involved.

Mr. Bennett then described the capture of the alleged snipers along with a lesson learned from the investigation. He said, "One of the greatest lessons to be learned is that leadership in directing communications interoperability is a national issue that is best addressed from the top down rather than from the local level up. The sniper investigation is an example of the type of

incident we [the public safety community] might anticipate and the lessons we should heed as we prepare for homeland defense."

> *"Now is the time to put aside organizational agendas and to pool our national resources to create a public safety voice radio and mobile data infrastructure that provides law enforcement, fire, rescue, and EMS personnel with the tools to do the job, any time, any place, and with technical and operational standards that reflect the new realities of global terrorism."*
> **Mike Bennett, Director, Electronic Services Section, Maryland State Police**

The following questions and answers were presented:

1.   How large was the Montgomery County communications system's footprint?

Mr. Bennett said that the footprint covered a large area. In addition to Montgomery County, he said that it provided coverage well into the State of Virginia and throughout the District of Columbia. For the incident, Montgomery County provided portable radio units for other entities. Some of these portable radios were left over from the Pentagon attack that occurred on September 11, 2001.

2.   Was there a particular agency responsible for data transmission?

Mr. Bennett replied that the Criminal Response Division of the State Police was responsible for data communications. In addition, he said that the Federal Bureau of Investigation used its RapidStar program for data communications.

2.16   Interoperability Success in San Diego County—the Regional Communications System (RCS)

Mr. Curt Munro, Manager of Wireless Services, San Diego County Sheriff's Department, began by presenting an overview of the San Diego's RCS. He described the RCS as a digital, trunked, Motorola 800 MHz communications system that enabled San Diego and Imperial County's local, state, and federal public safety agencies to communicate. The RCS cost more than $40 million to build and seven years to develop. He said that the system was implemented in 1998 and currently had more than 17,000 subscribers and provided coverage over 9,000 square miles. In total, 191 agencies used the RCS to communicate.

Mr. Munro described two major items that ensured the success of the RCS—shared governance and preparation. The first item, shared governance enabled those agencies that participated in the system to elect system representatives. More specifically, the "Participating Agency Agreement" gave users of the system the ability to vote for the RCS's Board of Directors, composed of eight user agency representatives. He said that Board of Directors would provide oversight and guidance for future system efforts.

Mr. Munro then explained how the second item, preparation, was valuable in ensuring the system's success. To ensure ease of system use and thereby facilitate user acceptance, system

managers prepared talk groups so that users only had to push the radio talk button to communicate. To further ensure the system was meeting stated requirements and goals, he said the region hired an independent consulting firm to perform an assessment study. This assessment study investigated the systems design, goals, and project management.

Mr. Munro concluded by detailing the future plans for the RCS. He said the Board of Directors anticipates that San Diego City would join the RCS in 2007. He explained that the cost of expanding the system to accommodate San Diego City would be approximately $150 million.

The following questions and answers were presented:

1.   Is the RCS' Board of Directors exploring the idea of adding data capabilities to the system?

Mr. Munro said that they are exploring the idea. He felt that mobile data would be a capability added sometime in the near term.

2.   Did you encounter any problems with public or private carriers?

Mr. Munro described one problem concerning interference. He said that the private carrier Nextel had caused interference and thus hindered transmission capabilities when officers were operating in several frequency ranges.

3.   Do your monthly revenues cover your actual expenses for the system?

Mr. Munro said that the revenues did cover the systems expenses. He stated that participants of the system were required to pay a monthly operating charge. Currently this charge was $26.50 per radio per month. He said that the RCS Board of Directors determined the system user fee at the beginning of each calendar year. He concluded by saying that the Board of Directors was required to ensure that the system did not incur a deficit.

4.   Do you expect to recover the development costs of the system?

Mr. Munro said that the region had recovered $35 million of the system's $40 million implementation costs. In addition, he said that the Board of Directors had set up a dedicated fund in preparation for emergency operations (e.g., towers go down) as well as a fund for grant "match money."

2.17   Spectrum Issues

Mr. Don Speights, Public Safety Program Manager, National Telecommunications and Information Administration, discussed three spectrum-related issues—interference issues experienced by public safety users in the 800 MHz frequency band, 700 MHz public safety band availability, and 4.9 gigahertz (GHz) public safety band allocation and service rules. He indicated that the first issue, 800 MHz band interference, had been particularly harmful to public safety entities. The effects of interference included reduced signal strength, communications

dead spots, and dropped calls. These effects had been experienced in more than 20 states and 65 cities.

Mr. Speights explained that a commercial mobile radio service (CMRS) provider, Nextel, was reportedly causing a large portion of the interference encountered in the 800 MHz band. He said that in November 2001, Nextel submitted a white paper as the first solution formally offered to the FCC to resolve the interference. He said that this white paper proposed that two blocks of spectrum be reorganized—

- Public Safety at 806.0125–815.9875 MHz and 851.0125–860.9875 MHz, including a guard band.

- CMRS at 816.0125–822.5875 MHz and 861.0125–867.5875 MHz.

Mr. Speights said that, in addition to these blocks of spectrum, the white paper proposed that Nextel would pay $500 million to public safety in return for the right to spectrum in the 2020–2025 MHz and 2170–2175 MHz bands. He said that the white paper also proposed that Nextel would provide 4 MHz of spectrum in the 700 and 900 MHz frequency bands for buying out incumbents' (Business and Industrial Land Transportation [B/ILT]) systems and specialized mobile radio (SMR) users.

In response to the white paper, Mr. Speights said, the Spectrum Policy Task Force was created in June 2002 to make recommendations for possible improvements to the interference issue. He said that the task force developed a consensus plan and recommendations. These recommendations included the following:

- All public safety licensees operating in the 806–809/851–854 MHz band would relocate to 809–814/854–859 MHz.

- Non-Nextel, site-licensed B/ILT and SMR licensees would be relocated to the guard band (814–816/859–861 MHz) or the interleaved non-cellular block (809–814/854–859 MHz), depending on availability, once the five-year exemption was lifted.

- Non-Nextel economic area licensees would also relocate from the 806–809/851–854 MHz band and receive equivalent licenses from the lower 80 economic area licenses currently occupied by Nextel.

- The National Public Safety Planning Advisory Committee channels would relocate, region by region, to the 806–809/851–854 MHz band, with prioritization based on the amount of interference experienced in a given region, and by population density.

- Nextel would remove all operations from the 809–816/854–861 MHz band.

To date, Mr. Speights stated, this issue was still being explored.

Mr. Speights continued by saying that the second issue, 700 MHz public safety band availability, was currently being worked by the FCC. Recently, the Fifth Report and Order

established a migration plan to the 6.25 kilohertz (kHz) channels as part of the implementation of Project 25 Phase II. He added that the Sixth Report and Order, which would cover the technical standards for emissions limits on base stations and mobile transmitters, would be issued in the near term and would outline the establishment of service rules for the 700 MHz band.

Mr. Speights reported that there had been important recent developments regarding the third issue, 4.9 GHz public safety band allocation and service rules. He said that the FCC had allocated 50 MHz of spectrum in the 4.9 GHz band for public safety use. This action fulfilled all but 23.5 MHz of the 97.5 MHz spectrum needed to support critical public safety communications through 2010.

Mr. Speights concluded with a discussion of future spectrum policy changes that lay on the horizon. He stressed to the audience that, "Participation is the key to ensure all views and needs are addressed as the Commission finalizes service rules and other regulations."

The following question and answer were presented:

1.   In which spectrum band do you see mobile data operating?

Mr. Speights said he anticipated that the 700 MHz frequency band would be the operational band for mobile data. He said that currently there was very little spectrum in the VHF band to support mobile data.

2.18   Next Symposium State Presentation and Invitation

Chief William Carrow, Communications Section, Delaware State Police, presented information on the State of Delaware's single, shared, 800 MHz trunked digital LMR system, which supports all of the state's public safety agencies. He said this system had a microwave backbone that traversed the width of the state (45 miles). He added that the system supported more than 40 user agencies and 700 talk groups.

Chief Carrow said that the Delaware had been very willing to forge relationships to enhance the state's ability to communicate with nearby states and regions. He described Delaware's current interoperability initiatives, which included developing agreements with the Maryland State Police and other Maryland counties. In the future, he explained that the state would like to continue developing interoperability with its neighboring states and counties.

The following question and answer were presented:

1.   At which government level were sharing agreements developed between
        Delaware and Maryland?

Chief Carrow indicated that Delaware had not signed "formal" agreements. The
agreements thus far had been rather informal and had been developed and agreed upon by
those agencies that oversaw the system. Similarly, Mr. Bennett indicated that Maryland
had usually participated in informal agreements with states, but added that he was
currently in the process of creating a memorandum of understanding (MOU) for the

MIMICS system. This MOU is approximately one-page in length and has the system's operational procedures attached.

Chief Carrow encouraged all those present to attend the Delaware Symposium scheduled for May 2003.